

## 2013 GREEN CHEMISTRY 101 WORKSHOP

### EXERCISE - MAKING INFORMED DECISIONS

**SCENARIO:** You have a Benchmark 1 chemical of concern that you need to replace. You are considering two alternatives that are both Benchmark 2 chemicals. The chemical of concern is an additive in a polymer.

**OBJECTIVE:** Determine the best substitute for the chemical of concern.

**INSTRUCTIONS:** Review the Hazard Summary Table below and answer the three questions on the next page.

Chemical	CAS#	%	GS BM	Group I Human					Group II and II* Human								Ecotox		Fate		Physical		
				C	M	R	D	E	AT	ST		N		SnS*	SnR*	IrS	IrE	AA	C A	P	B	Rx	F
										single	repeat*	single	repeat*										
Chemical 1	XXX-XX-X	100%	1	H	H	M	M	DG	vH	L	M	L	M	H	H	H	H	vH	vH	vH	vH	L	L
Alternative 1	XXX-XX-X	100%	2	L	M	L	L	DG	L	M	M	M	M	M	L	M	M	M	L	L	M	M	M
Alternative 2	XXX-XX-X	100%	2	M	DG	L	L	M	H	DG	DG	M	M	M	M	M	H	M	M	H	M	M	M

L = low hazard, M = moderate hazard, H = high hazard, vH = very high hazard, DG = data gap

Group I Human: C = cancer, M = mutagenicity, R = reproductive toxicity, D = developmental toxicity, E = endocrine activity

Group II and II\* Human: AT = acute toxicity, ST = systemic toxicity, N = neurotoxicity, SnS = skin sensitization, SnR = respiratory sensitization, IrS = skin irritation, IrE = eye irritation

Ecotox, Fate, and Physical: AA = acute aquatic toxicity, CA = chronic aquatic toxicity, P = persistence, B = bioaccumulation, Rx = reactivity, F = flammability

1. **Identify some of the trade-offs between the two alternatives from the following 4 perspectives.** [Hint: Focus key routes of exposure that are most important to consider the manufacturing and use – for example a polymer intended for use in contact lenses, versus a fire fighting foam]
  - a. Consumers/Users
  - b. Workers
  - c. Environmental Fate and Transport
  - d. Data Confidence and Completeness
2. **Which alternative would you select based on the information provided and why?**
3. **What other factors would you consider (beyond human, environmental, and physical hazards already discussed) in order to make this choice?**

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